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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/635,348	08/06/2003	George Ernest Harris	TI-35894	8892
23494	7590	07/14/2006		
TEXAS INSTRUMENTS INCORPORATED P O BOX 655474, M/S 3999 DALLAS, TX 75265			EXAMINER RADOSEVICH, STEVEN D	
			ART UNIT 2138	PAPER NUMBER

DATE MAILED: 07/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/635,348	Applicant(s) HARRIS ET AL.	
	Examiner Steven D. Radosevich	Art Unit 2138	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 16-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims 1-15 are present in this Response to applicants instant Response. Acknowledgement is made that claims 16-22 have been cancelled and are not presented in this examination.

Priority

Acknowledgement is made no priority is claimed for this application and as such the filing date (08/06/2003) is being used for this examination.

Information Disclosure Statement

Acknowledgement is made that an Information Disclosure Statement (IDS) was not provided with the application.

Response to Arguments

Applicant's arguments filed 4/13/06 have been fully considered by the Examiner. Applicant's arguments with respect to claims 1-15 have been considered but not persuasive.

Applicant argues on page 7 paragraph 3 that claims 1-15 were rejected under 35 USC 103(a) as being unpatentable over Hughes and Giles. Claims 1 and 15 include ... a dummy match row unit ... configured to match layout parasitics of match lines of the memory cellsThe references of record do not show teach, or suggest the above

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limitations of claims 1 and 15. Claims 2-14 depend from claim 1. Therefore, claims 1-15 are believed to be allowable over the references of record.

It is unclear to the examiner from reading the specification how the dummy match row unit is any different from that of the dummy match column since the specification does not suggest or teach any specifics of the limitation applicant is indicating is not shown, taught, or suggested. The specification only describes the dummy match row unit on page 3 lines 18-23 wherein it is stated "the test structure contains a dummy match row unit coupled to the memory array and configured to match layout parasitics of the match lines of the memory cells, ..." The limitation therefore can not be given patentable weight from the information provided from the applicant since it appears the limitation is the same as the dummy column unit. For the purposes of examination the dummy match row unit is considered a vertical equivocate to the dummy match column unit.

Therefore the examiner maintains the prior rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

1. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hughes et al. (US 6691252) and Giles et al. (US 4680760).
2. As per claim 1: Both Hughes and Giles teach an electronic memory test structure for testing a CAM having a memory array containing memory cells, the electronic test structure comprising:

Hughes teaches the electronic memory test structure comprising:

Column testing of a CAM memory array (column 6 lines 8-9);

Row testing of a CAM memory array (column 7 lines 2-4);

A timing circuit coupled to both the columns and row (column 9 lines 59-65).

A control circuit coupled to the timing circuit (column 9 lines 59-65).

Hughes does not teach a column or row dummy match unit coupled to the memory array.

Giles teaches the electronic memory test structure comprising:

A dummy match row unit (column 2 line 37, 28; figure 2) coupled to the memory array (10- CAM array; figure 1) through the match lines (18-match lines;

figure 2), said dummy match row unit (28; figure 2) being configured so as to match bitline loading (20 and 22; figure 1 and 2) of the memory cells during a search.

However those of ordinary skill in the art would recognize that rotating Giles' test structure would result in the dummy match row (column 2 lines 20-22, 37-39) being a dummy match column unit.

Therefore one of ordinary skill in the art would be motivated to rotate Giles' test structure to obtain a dummy match column unit in order to perform vertical testing of a CAM array to isolate and test individual CAM array cells in a row. Furthermore, one would be motivated to combine Hughes' column and row testing structure with Giles' dummy match unit structure for testing a CAM having a memory array according to Giles, test each component of the test structure (column 2 lines 53-55), and according to Hughes, capitalize on chip surface area "real estate" (column 1 lines 32-33).

3. As per claim 2: Giles teaches the above electronic memory test structure wherein the dummy match row (column 2 lines 20-22, 37-39) is configured so as not to pull the match lines (18; figure 2) to the logic high state during a normal search mode (column 2 lines 36-39).

4. As per claim 3: Hughes teaches the above electronic memory test structure wherein the control circuit (column 9 line 62) causes a transition so as to match timing of the bitline transitions of the memory cells (column 3 lines 55-59).

5. As per claim 4: Giles teaches the above electronic memory test structure wherein a dummy timing circuit (column 5 lines 13-16) always generates a miss on the dummy match line (column 2 lines 36-39).

Giles does not teach a miss on the dummy match line (18-match; figure 2) caused by a transit of the dummy match line (18-match; figure 2) to a high (1) state.

However it would have been obvious to one of ordinary skill in the art at the time the invention was made to invert the miss taught by Giles, indicated by a zero (0) into a high state (1), since it was well known in the art to invert a signal to get the desired value ((1) to indicate a miss) based on the logic of the circuit.

Therefore one would be motivated to invert Giles's logic where when doing so the cost of circuitry to implement the inverted logic is more reliable or cost effective.

6. As per claim 5: Giles teaches the above electronic memory test structure wherein a dummy match control circuit (28; figure 2) has a low search input and one of a low match state and a high match state (column 2 lines 29-39); and mask inputs are set to high so that the memory array (10; figure 1) is not searched (column 2 lines 53-55).

7. As per claim 6: Hughes teaches the above electronic memory test structure wherein a priority encoder is coupled to the memory array through the match lines (column 9 lines 39-45).

8. As per claim 7: Hughes teaches the above electronic memory test structure wherein a priority encoder control unit is coupled to the priority encoder, and to the

dummy match row unit through the dummy match line (column 9 line 59-65, figure 7, column 9 line 44-46).

9. As per claim 8: Hughes teaches the above electronic memory test structure wherein each cell of a match column generating a logic high level on the match lines during a test mode for passing onto the memory array (column 6 lines 5-13, figure 2).

10. As per claim 9: Giles teaches the above electronic memory test structure wherein any cell of the dummy match row does not generate a logic high level on the match lines during another test mode (column 4 lines 9-17).

11. As per claim 10: Hughes teaches the above electronic memory test structure wherein the priority encoder receives all the generated logic high levels through the match lines (column 9 lines 39-45, figure 7).

12. As per claim 11: Giles teaches the above electronic memory test structure wherein the match lines (18; figure 2) from the memory array (10; figure 1) to the priority encoder (32; figure 1) are at low levels (column 2 line 36-39).

13. As per claim 12: Giles teaches the above electronic memory test structure wherein the test mode is all-hits mode (column 4 lines 9-13).

14. As per claim 13: Giles teaches the above electronic memory test structure wherein the other test mode is all hits (column 4 lines 9-21).

Giles does not teach the other test mode is all-misses mode.

However It would have been obvious to one of ordinary skill in the art at the time the invention was made to invert the all hit test (column 4 lines 15-21) taught by Giles.

Therefore one would be motivated to do so since it was well known in the art as indicated by Hughes that single cells may become stuck at a value regardless of the data attempted to be written into them (column 2 lines 4-16).

15. As per claim 14: Giles teaches the above electronic memory test structure wherein the electronic memory test structure further comprise:

A dummy read column unit (34-entry selection; figure 1) coupled to the memory array (10-CAM array; figure 1) for matching timing (entry selection control; figure 1) characteristics of the wordline signals (column 3 lines 37-38, column 4 lines 11-21) of the memory array (10-CAM array; figure 1).

Giles does not directly teach a dummy read row unit for matching timing characteristics of the wordline signals of the memory array.

Hughes teaches an interconnected match latch unit (707; figure 7) and wordline driver (706; figure 7) coupled between the priority encoder (705- redundancy allocation circuitry) and memory array (701-CAM; figure 7).

However It would have been obvious to one of ordinary skill in the art at the time the invention was made to rotate Giles' CAM memory array so that the dummy read column unit (34- entry selection; figure 1) becomes a dummy read row unit.

Therefore one would be motivated to perform this rotation to implement row testing to isolate and test individual CAM array cells in a row as stated above as per claim 1.

16. As per claim 15: Giles teaches an integrated circuit for testing a CAM having a memory array containing memory cells (10-CAM array; figure 1), comprising:

An integrated circuit substrate having a dummy match row unit (28; figure 2, column 2 lines 32, 37-39, figure 1) coupled to the memory array (10-CAM array; figure 1), said dummy match row unit (28; figure 2) configured to match layout parasitics of the match lines of the memory cells (column 2 lines 27-39);

A dummy timing circuit coupled to the dummy match row (system clock; column 5 lines 15-16), said dummy timing circuit being configured to always generate a miss on a dummy match line during the search (column 2 lines 37-39); and

Giles does not directly teach:

A dummy match column (vertical set of 28; figure 2) having dummy match cells (28; figure 2) coupled to the memory array through the match lines (Match; figure 1), said dummy match column (vertical set of 28; figure 2) being configured so as to match bitline loading of the memory cells during a search (20 and 22; figure 1 and 2). However it would have been obvious to one of ordinary skill in the art at the time the invention was made to rotate Giles' CAM memory array so that the dummy match column unit (34- entry selection; figure 1) becomes the claimed dummy read row unit. One would be motivated to perform this rotation to implement row testing to isolate and test individual CAM array cells in a row as stated above as per claim 1.

A dummy timing circuit (system clock; column 5 lines 15-16) coupled to the dummy match column and to the dummy match row, said dummy timing circuit being configured to always generate a miss on a dummy match line during the search (column 2 lines 37-39). However it would have been obvious to one of ordinary skill in the art at

the time the invention was made to have the timing circuit (system clock; column 5 lines 15-16) coupled to both the dummy match row and column and to always generate a miss on a dummy match line. One would be motivated to couple both the dummy row and column to the time circuit for synchronization and to generate a miss on a dummy match line to reset or set a default setting on the match line.

A dummy match control circuit coupled to the dummy timing circuit. However Hughes teaches in an analogous art a control circuit and a CPU (column 9 line 62). Therefore since all electronic components in a working electronic system require a connection to a CPU or control unit/circuit it would have been obvious to one of ordinary skill in the art at the time the invention was made to have Hughes' control circuit coupled to the dummy timing circuit. One would be motivated to have a control circuit coupled to the dummy timing circuit since it is a necessity for a working electronic system.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

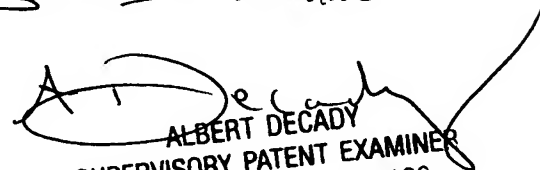
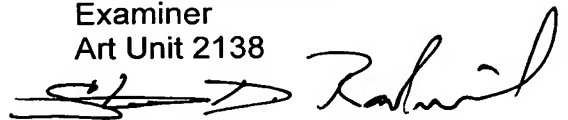
the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven D. Radosevich whose telephone number is 571-272-2745. The examiner can normally be reached on 9am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on 571-272-3819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Steven D. Radosevich
Examiner
Art Unit 2138



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